DEPARTMENT OF NATIONAL DEFENCE
CANADA

OPERATIONAL RESEARCH DIVISION

DIRECTORATE OF OPERATIONAL RESEARCH (JOINT & LAND)

DOR(J&L) RESEARCH NOTE 9910

TOWARDS THE DEVELOPMENT OF A FORCE PLANNING SCENARIO FRAMEWORK FOR DND

BY

G. L. Christopher
P. Comeau
R. Funk
And
S. Isbrandt

OCTOBER 1999

OTTAWA, CANADA

National Defence Défense nationale

OPERATIONAL RESEARCH DIVISION

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OTTAWA, ONTARIO

OCTOBER 1999

ABSTRACT

One of the first tasks given to the Strategic Planning Operational Research Team (SPORT), upon its establishment in January 1997, was to lead the effort of the Directorate of Defence Analysis (DDA) to develop a scenario-based capability planning framework. This framework is commonly referred to as the Force Planning Scenario Framework. After consulting with Canada's major Allies, reviewing the literature and exploring possible methodologies, a concept for the framework was specified. A proof of concept trial was undertaken during the Spring of 1999. Before providing the Director General Strategic Planning (DGSP) with the results of the trial, a briefing covering the background of the development effort leading to the concept was conducted.

This report covers the content of the background briefing given to DGSP on 28 June 1999. This report also serves as one of the documents recording the history and process of the development of the Force Planning Scenario Framework.

RÉSUMÉ

À sa création en janvier 1997, l'Équipe de recherche opérationnelle en planification stratégique (EROPS) s'est vu confier, comme l'une de ses premières tâches, la direction des travaux du Directeur – Analyse de défense visant à élaborer un cadre de planification des capacités qui se fonde sur les scénarios, connu généralement sous le nom de Structure des scénarios de planification des forces. La définition d'un concept pertinent a fait suite aux consultations tenues auprès des alliés du Canada, après une étude de la documentation et après une exploration des méthodes éventuelles. Un essai de validation de principe a été réalisé au printemps 1999. Avant de présenter les résultats de l'essai au Directeur général – Planification stratégique, une séance d'information a été tenue pour offrir un aperçu sur les travaux d'élaboration du concept.

Le présent rapport couvre l'exposé fait au DGPS le 28 juin 1999. Il permet également de documenter l'historique de la Structure des scénarios de planification des forces et l'avancement des travaux d'élaboration.

TABLE OF CONTENTS

ABSTRACT I

RÉSUMÉ I

TABLE OF CONTENTS II

I - INTRODUCTION 1

BACKGROUND 1

II - PRESENTATION 3

OPENING REMARKS 3

PRESENTATION OUTLINE 4

PROJECT INITIATION 5

PAST PRACTICE 6

PROJECT GOAL 7

PROJECT OBJECTIVES 8

THE VISION 9

ALLIES' EXPERIENCES 10

EXTERNAL WORKING GROUP 11

SCENARIO SET 112

SPECTRUM OF CONFLICT 13

FRAMEWORK DEVELOPMENT TRACKS 14

SENIOR MANAGEMENT ENDORSEMENT 15

FORCE PLANNING AND DEVELOPMENT 16

SCENARIO EXPANSION 17

DEFINITION OF CAPABILITY 18

CAPABILITY IDENTIFICATION 19

UNIVERSAL JOINT TASK LIST 20

UJTL CONDITIONS 21
JOINT TASK LIST VARIANTS 22
JTL CAPABILITY EXAMPLE 23
SCENARIO ANALYSIS 24
STRATEGIES-TO-TASK CONCEPT 25
SCENARIO ANALYSIS TOOLS 26
RISK ASSESSMENT MODEL 27
SOCRAM CONCEPT 28
SOCRAM STRUCTURE 29
VERTICAL & HORIZONTAL ANALYSIS 30
SCENARIO VARIATIONS 31
SAMPLE OUTPUT FROM SOCRAM 32
FULL CF CAPABILITY ANALYSIS 33
PROOF-OF-CONCEPT TRIAL 34
CONSTRAINTS ON CONCEPT TRIAL 35
TRIAL RESULTS BRIEFING 36
CONCLUSIONS 37
REFERENCES 38

TOWARDS THE DEVELOPMENT OF A FORCE PLANNING SCENARIO FRAMEWORK FOR DND

I - INTRODUCTION

BACKGROUND

1. The Director General Strategic Planning (DGSP) organization, including the Directorate of Defence Analysis (DDA), was stood up in October 1996. The Strategic Planning Operational Research Team (SPORT) joined DDA in January 1997 as Section 2 (DDA 2).

2. One of the first tasks given to the new organization was the development of force planning scenarios and a framework for their analysis to support force planning (Ref.1). This initiative began as a result of a 1994 review of defence planning practices by the Office of the Auditor General (OAG). In that1994 report (Ref. 2), the OAG concluded that there was an inadequate linkage between capability planning and defence policy. The report recommended planning scenarios spanning the spectrum of CF operations be created and incorporated into defence planning, to correct this deficiency. The Department accepted this recommendation and agreed to develop a set of force planning scenarios.

3. Work on this initiative culminated in rudimentary descriptions of four planning scenarios specified in Defence Planning Guidance (DPG) 1997 (Ref. 3). DDA's task was to take this beginning and advance the development of the scenarios to meet the requirements of the Department and the recommendations of the OAG.

4. DDA's first action for this project was to organize a workshop to identify the basic elements to be included in each scenario within the planning set. Participants were invited from each Capability Component and Group Principal within DND. The workshop was held 24 February to 6 March 1997. From the workshop results, a first draft of 11 scenario descriptions was issued in April 1997 (Ref. 4). The conduct of the workshop leading to the specification of 11 force planning scenarios is documented in Reference 5. Since issuing the initial drafts, several iterations of review and modification have transpired. The latest versions of the Scenario Snapshots were described in DPG 2000 (Ref 6) and are available from DDA.

5. The participants and organizations represented at the workshop remained as the External Working Group (EWG) for scenario development after the conclusion of the

workshop. The EWG provides crucial support in developing the scenario descriptions and the concept for the analysis of the scenarios. The support of the EWG will also be crucial in collecting the needed input data to conduct the capability requirements analysis once the scenario framework is completed.

6. Along with the scenario descriptions, work proceeded in parallel to define an analysis framework to support the evaluation of Canadian Forces (CF) capability based upon the force planning scenarios. The general concept for the scenario-based capability planning framework was identified and presented to the Defence Management Committee (DMC) in November 1997. At that meeting, DMC endorsed the concept and approved the proposed way ahead.

7. After much brainstorming and effort examining and evaluating potential analysis tools, a detailed concept for the analysis component of the framework was developed in DDA. The goal in defining the analysis concept for the Force Planning Scenario Framework was to produce a valuable decision support tool for capability planning, as quickly as possible. It was recognized that the concept once implemented would constitute the first version of a constantly evolving and improving system.

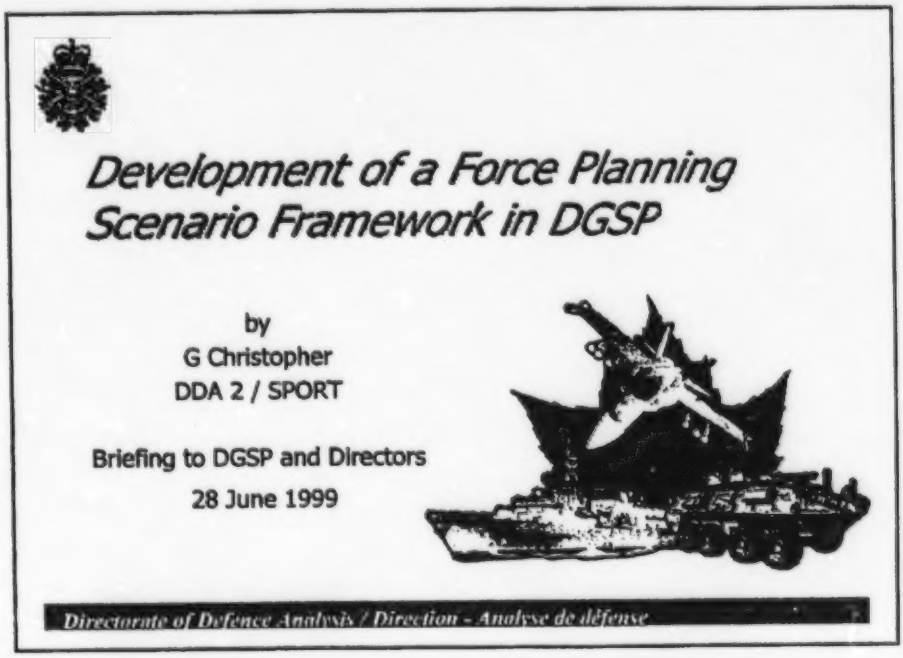
8. A proof-of-concept trial was undertaken to test and evaluate the proposed concept for the Framework before releasing the details to the EWG and Senior Management. The trial was to be completed by the summer of 1999 and the results briefed to DGSP at that time.

9. In preparing for the DGSP briefing, it was decided to conduct two briefings due to the extensive amount of material to be covered. The first briefing would explain the background of the Scenario Framework project, covering the initiation of the project, the development history and the details of the concept. The second briefing would focus on the results of the proof-of-concept trial and the way ahead.

10. The contents of the first presentation on the background and concept of the Force Planning Scenario Framework are documented in this report.

II - PRESENTATION

OPENING REMARKS

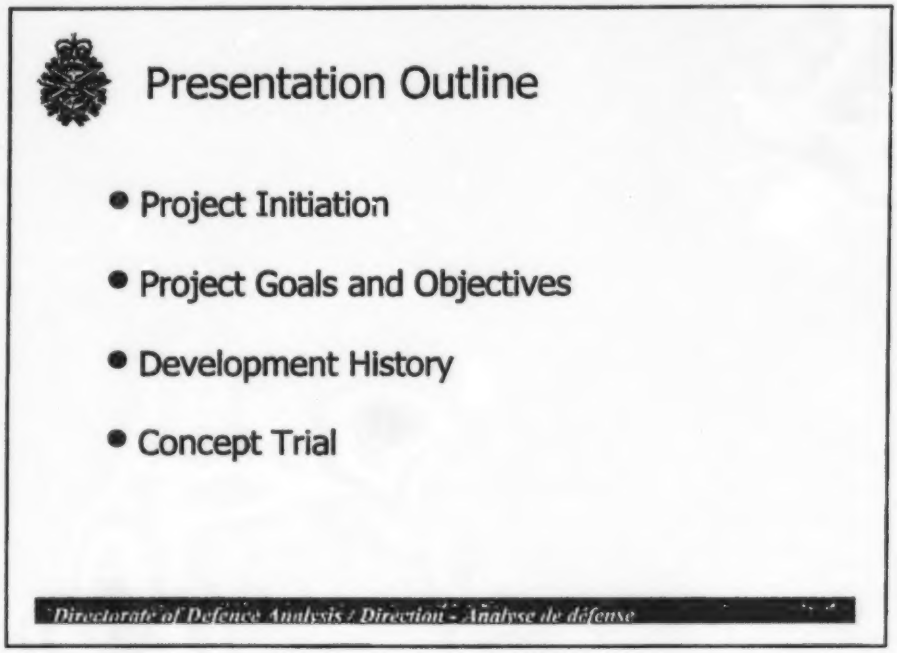

Development of a Force Planning Scenario Framework in DGSP
by
G Christopher
DDA 2 / SPORT
Briefing to DGSP and Directors
28 June 1999
Directorate of Defence Analysis / Direction - Analyse de défense

Slide 1 : Title Slide

11. On 14 July, the results of a proof-of-concept Trial for the Force Planning Scenario Framework will be presented.

12. Today, the background to this project will be presented to allow one to understand where the project has come from and how it has arrived at state it is at today. Covering, in detail, the project background now will allow the next briefing, on 14 July 1999, to focus on the results of the Trial and the way ahead.

PRESENTATION OUTLINE

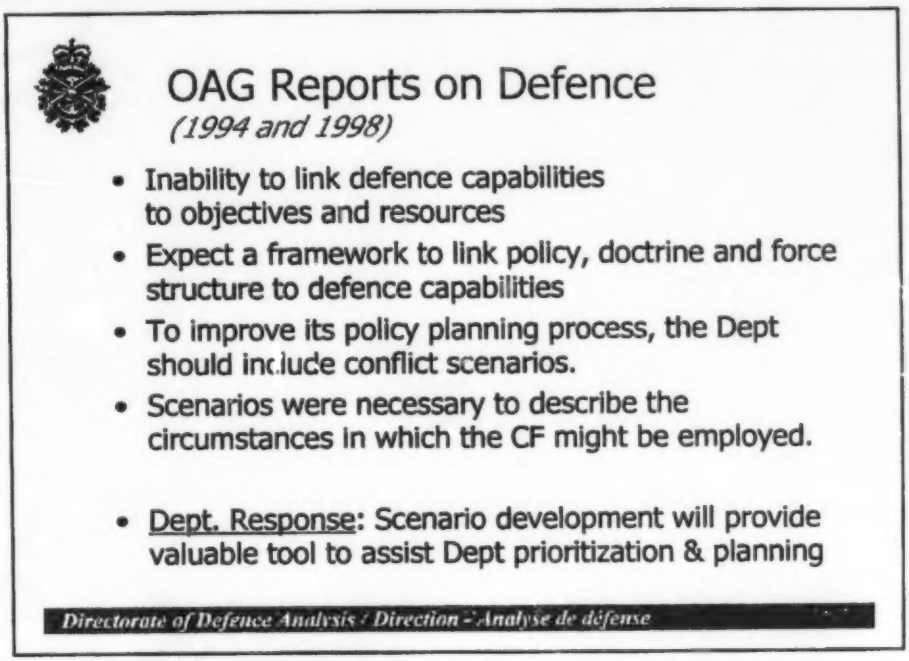


Slide 2 : Presentation Outline

13. This briefing will cover the following aspects of the project:

- how the project was initiated,
- what goals and objectives were set for the project,
- how the development has unfolded to date, and
- the details of the Proof-of-Concept Trial being conducted by the Directorate of Defence Analysis (DDA).

PROJECT INITIATION

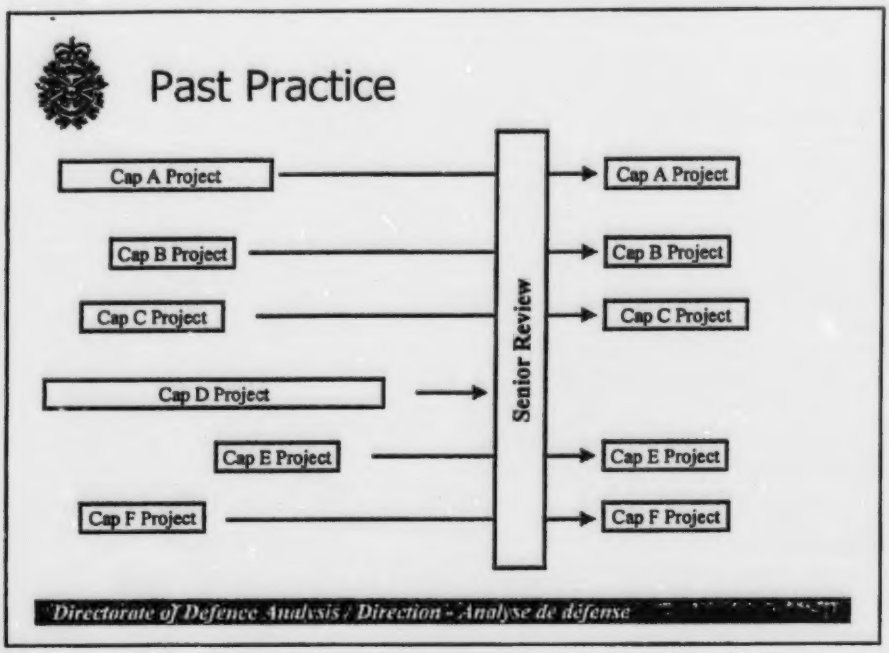

OAG Reports on Defence
(1994 and 1998)
• Inability to link defence capabilities to objectives and resources
• Expect a framework to link policy, doctrine and force structure to defence capabilities
• To improve its policy planning process, the Dept should include conflict scenarios.
• Scenarios were necessary to describe the circumstances in which the CF might be employed.
• Dept. Response: Scenario development will provide valuable tool to assist Dept prioritization & planning
Directorate of Defence Analysis / Direction - Analyse de défense

Slide 3 : OAG Reports On Defence (1994 And 1998)

14. If a single factor had to be identified which started the Scenario project, it would be the Auditor General's criticism of the Department of National Defence (DND) force development practice.

15. The Auditor General (AG) has reviewed the Force development process on a couple of occasions. In the 1994 Report, the AG concluded that there was a poor link between Defence Policy and the planning and management of CF capabilities. The AG made the recommendation that conflict scenarios be used to address this deficiency. In response, DND accepted the recommendation and began working on incorporating scenarios in the force development process

PAST PRACTICE

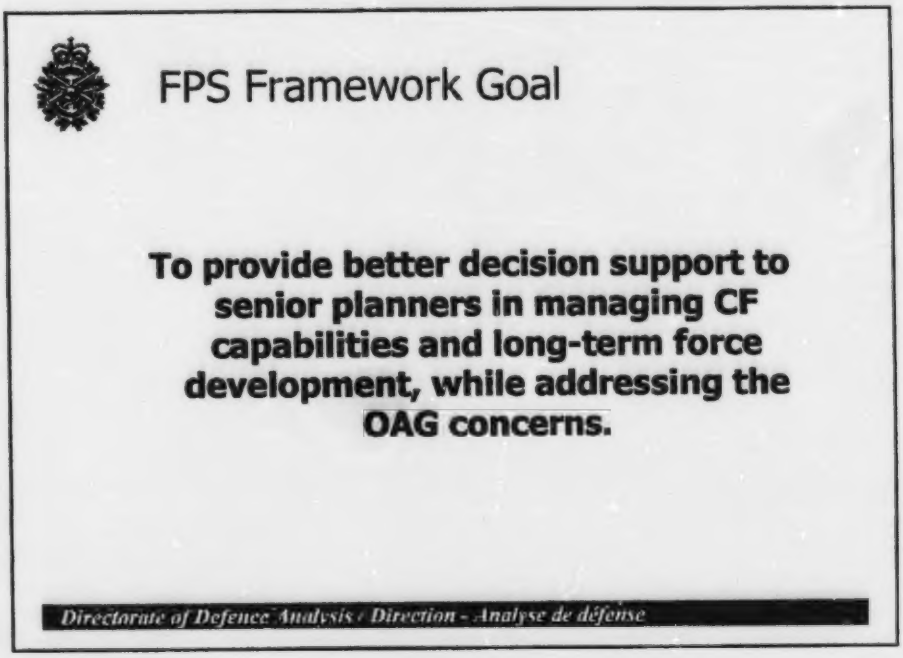


Slide 4 : Past Practice

16. In the past, capability projects of all sizes went through the review process more of less independently. For the most part, each project was reviewed on its own merits in isolation, on case-by-case basis. Requirements were evaluated and substantiated using a wide variety of analysis methods. Projects were often single-service equipment-replacement oriented. The implications for joint operations were largely left to Review Board consideration. Evaluation scenarios, if used at all, were unique and purpose-built for the project.

17. In short, the process lacked rigour, consistency, and comprehensiveness.

PROJECT GOAL

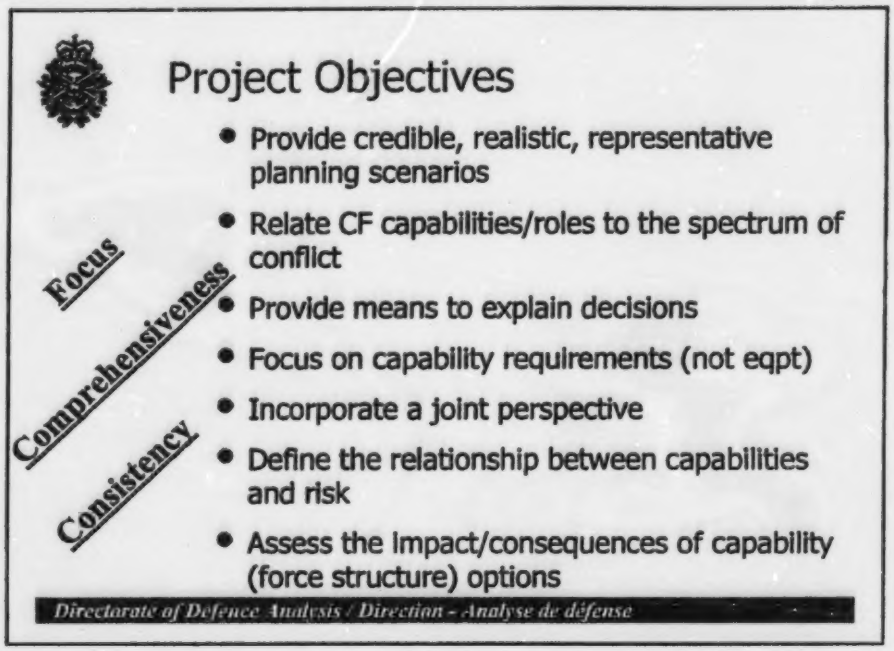

FPS Framework Goal
To provide better decision support to senior planners in managing CF capabilities and long-term force development, while addressing the OAG concerns.
Directorate of Defence Analysis / Direction - Analyse de défense

Slide 5 : Project Goal

18. The very broad goal set for the Force Planning Scenario (FPS) Framework was to improve the decision making process while satisfying the concerns and recommendations of the Auditor General.

19. It should also be noted that no specific direction or detailed expectations for the project were specified when DDA was tasked with the project. This goal was developed internally by the DDA development team.

PROJECT OBJECTIVES

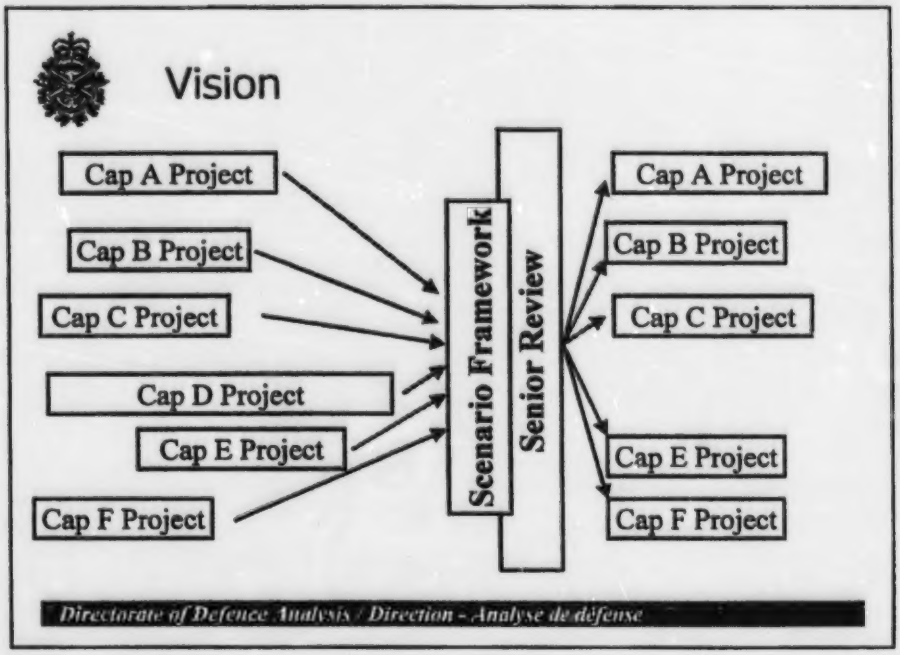

Project Objectives
Provide credible, realistic, representative planning scenarios
Relate CF capabilities/roles to the spectrum of conflict
Provide means to explain decisions
Focus on capability requirements (not eqpt)
Incorporate a joint perspective
Define the relationship between capabilities and risk
Assess the impact/consequences of capability (force structure) options
Focus
Comprehensiveness
Consistency
Directorate of Defence Analysis / Direction - Analyse de défense

Slide 6 : Project Objectives

20. A large number of objectives were set for the framework. The most important objectives are listed here:

- develop a minimum set of realistic scenarios based on past experience and future expectations for Canadian Forces (CF) employment,
- relate all CF capabilities to their employment across the spectrum of conflict that the CF may operate in,
- provide a means to explain decisions within the Department, to the Government and the general public,
- incorporate a comprehensive perspective in decision-making (go beyond single service considerations),
- relate capability levels to risk in order to support risk management, and
- be able to evaluate the impact of different capability (force structure) options

THE VISION

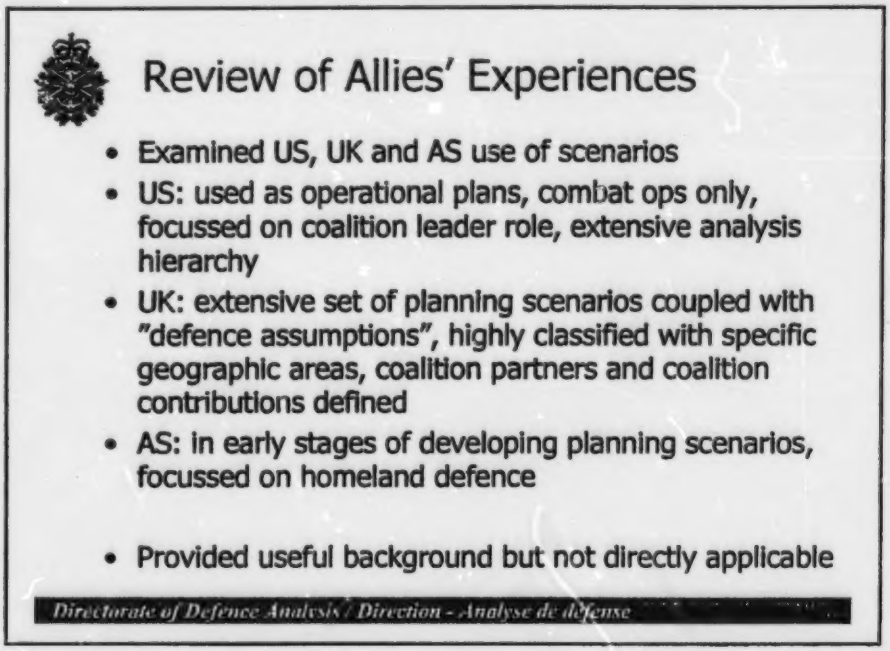


Slide 7 : The Vision

21. The vision that DDA has for this project is to provide a framework that will support a comprehensive, consistent review and decision-making process to acquire and maintain capabilities for the CF. The framework will provide a common basis for review and evaluation of proposed projects. It will provide the foundation to rationalize all capability requirements for the CF.

22. It should be emphasized at this point that the Scenario Framework is not proposed as the ultimate or only tool that should be used for force planning and development. A variety of analysis tools may be employed to explore various facets of the issues involved in force planning. The Force Planning Scenario Framework will not be the only tool, but a basic one consistently employed.

ALLIES' EXPERIENCES


Review of Allies' Experiences
• Examined US, UK and AS use of scenarios
• US: used as operational plans, combat ops only, focussed on coalition leader role, extensive analysis hierarchy
• UK: extensive set of planning scenarios coupled with "defence assumptions", highly classified with specific geographic areas, coalition partners and coalition contributions defined
• AS: in early stages of developing planning scenarios, focussed on homeland defence
• Provided useful background but not directly applicable
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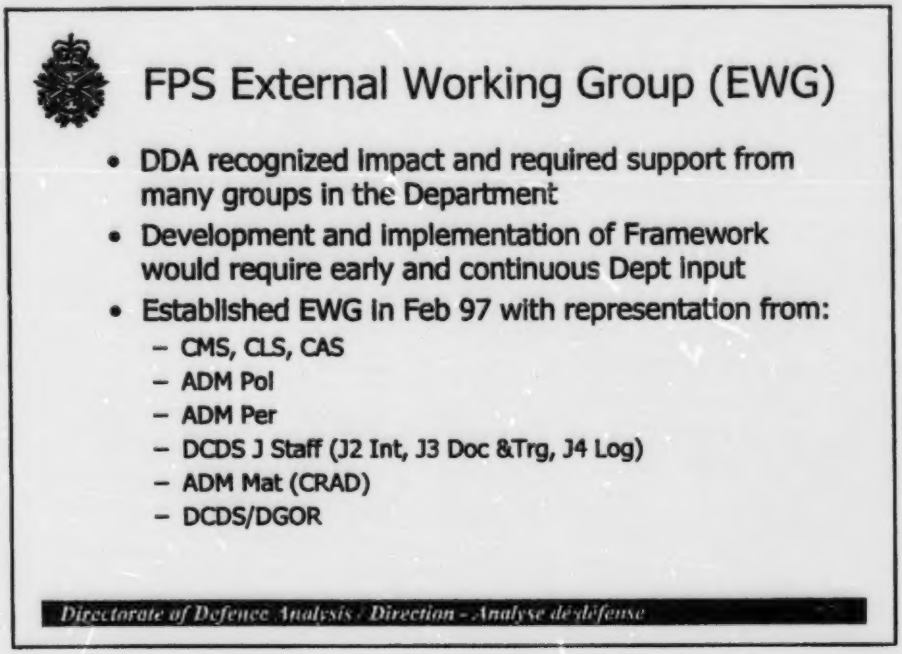
Slide 8 : Review Of Allies' Experiences

23. Early on, DDA contacted Canada's major allies to see how if and how they used planning scenarios in there force development process. It found that each of the US, UK and AS utilized scenarios in one way or another. The way in which the scenarios were specified and applied was very specific to the nation's planning process. None of their approaches was a perfect match to meet Canada's requirements.

24. So, DDA borrowed some elements from their concepts, took into account their lessons learned and began developing a Canadian version to meet DND's needs.

EXTERNAL WORKING GROUP


FPS External Working Group (EWG)
• DDA recognized impact and required support from many groups in the Department
• Development and implementation of Framework would require early and continuous Dept input
• Established EWG in Feb 97 with representation from:
– CMS, CLS, CAS
– ADM Pol
– ADM Per
– DCDS J Staff (J2 Int, J3 Doc &Trg, J4 Log)
– ADM Mat (CRAD)
– DCDS/DGOR
Directorate of Defence Analysis / Direction - Analyse de la défense

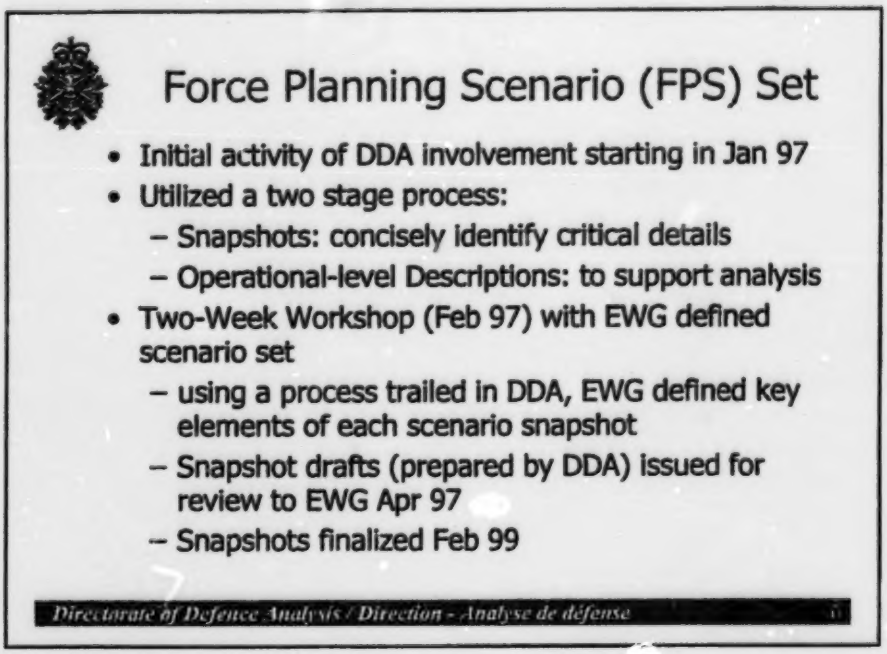
Slide 9 : FPS External Working Group (Ewg)

25. From the start it was recognized that Departmental support and involvement was going to be essential to the development of the system. An external working group (EWG) was established with representatives from each of the Environmental staffs and Group Principal organizations.

26. There has been significant advantages and disadvantages to the involvement of the EWG. Having a base of wide expertise has been very useful in developing the scenario descriptions. This was essential, as DDA does not possess the full breadth of expertise required for such an undertaking.

27. The downside is that concept development by committee is usually very slow and this effort has been no exception. Membership changes over the course of development added an additional periodic indoctrination burden to the process.

SCENARIO SET


Force Planning Scenario (FPS) Set
• Initial activity of DDA involvement starting in Jan 97
• Utilized a two stage process:
– Snapshots: concisely identify critical details
– Operational-level Descriptions: to support analysis
• Two-Week Workshop (Feb 97) with EWG defined scenario set
– using a process trailed in DDA, EWG defined key elements of each scenario snapshot
– Snapshot drafts (prepared by DDA) issued for review to EWG Apr 97
– Snapshots finalized Feb 99
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Slide 10 : Force Planning Scenario (FPS) Set

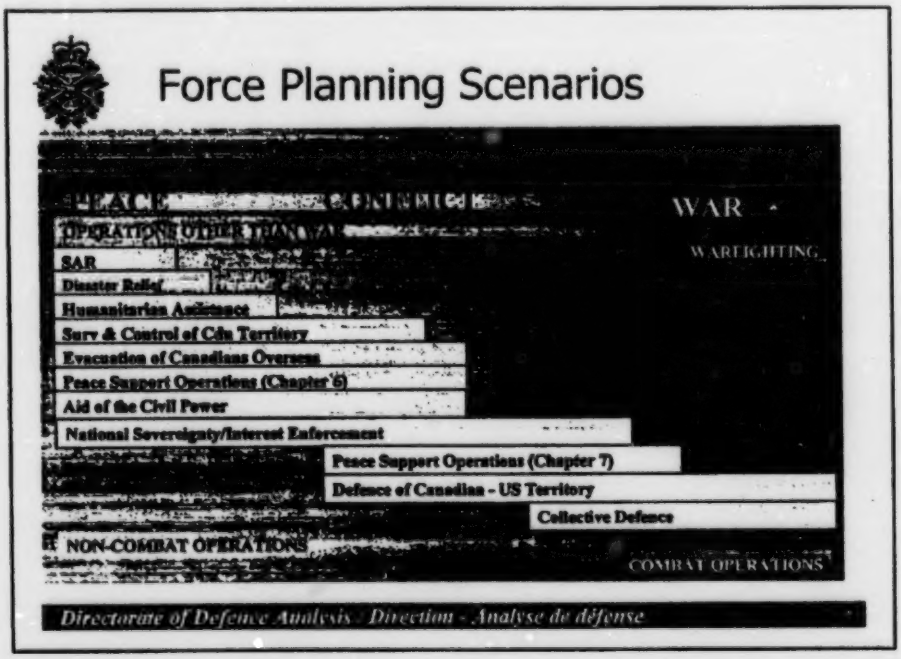
28. DDA initiated this project in earnest in Jan 97 with the joining of the Operational Research team. The first order of business was to establish the scenario set. Two levels of descriptions were felt to be advantageous, snapshots and operational descriptions. The Snapshots could be established quickly and kept unclassified and publicly available. The detailed operational descriptions would take longer but would be required to support detailed requirements analysis.

29. A two-week workshop was conducted with the EWG to develop the Snapshots. The Snapshot elements were identified and DDA subsequently produced the initial drafts.

30. The Snapshots have been subjected to extensive reviews by the EWG and have had cursory examinations by the Department of Foreign Affairs and Industrial Trade and the Privy Council Office. Some minor concerns remain, but no major obstacles have been identified.

31. With their inclusion in DPG 2000, the Snapshots appear to be finalized now.

SPECTRUM OF CONFLICT

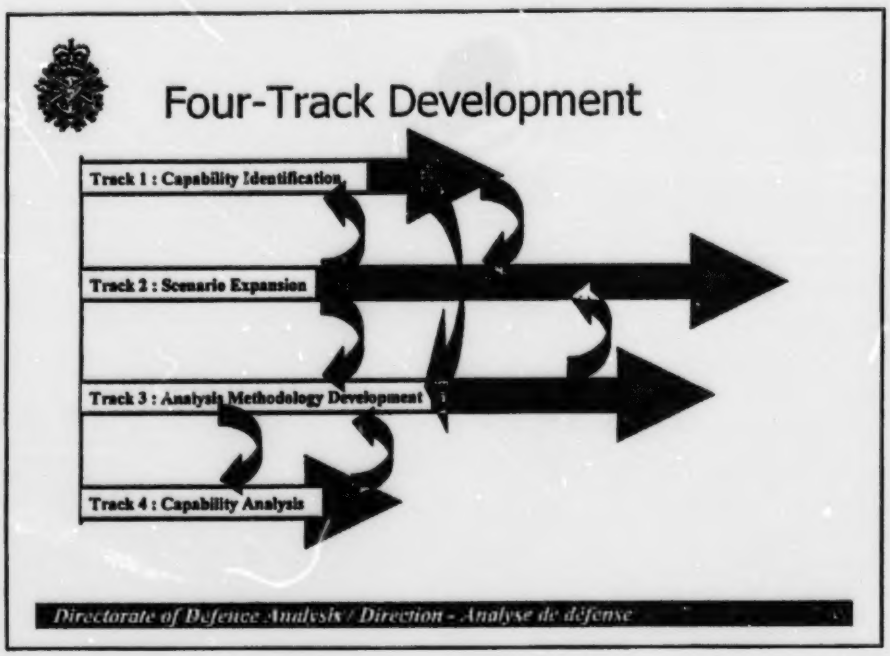


Slide 11 : Force Planning Scenarios

32. Eleven planning scenarios have been identified based on Defence Policy (1994 White Paper) direction, the historical employment of the CF and future expectations for the CF involvement. The Force Planning Scenarios ranging from peacetime operations such as search and rescue (SAR) and disaster relief to peace support operations in the middle of the conflict spectrum, to collective defence (NATO) at the high end of the combat spectrum.

33. As was stated earlier, a two-page Snapshot concisely describing the general details of the hypothetical situation has been written for each Scenario. These Snapshots have described and endorsed in the latest Defence Planning Guidance (DPG 2000). An effort to expand the Scenario descriptions to greater detail to support capability analysis is currently underway.

FRAMEWORK DEVELOPMENT TRACKS


Four-Track Development
Track 1 : Capability Identification
Track 2 : Scenario Expansion
Track 3 : Analysis Methodology Development
Track 4 : Capability Analysis
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Slide 12 : FPS Framework Development Tracks

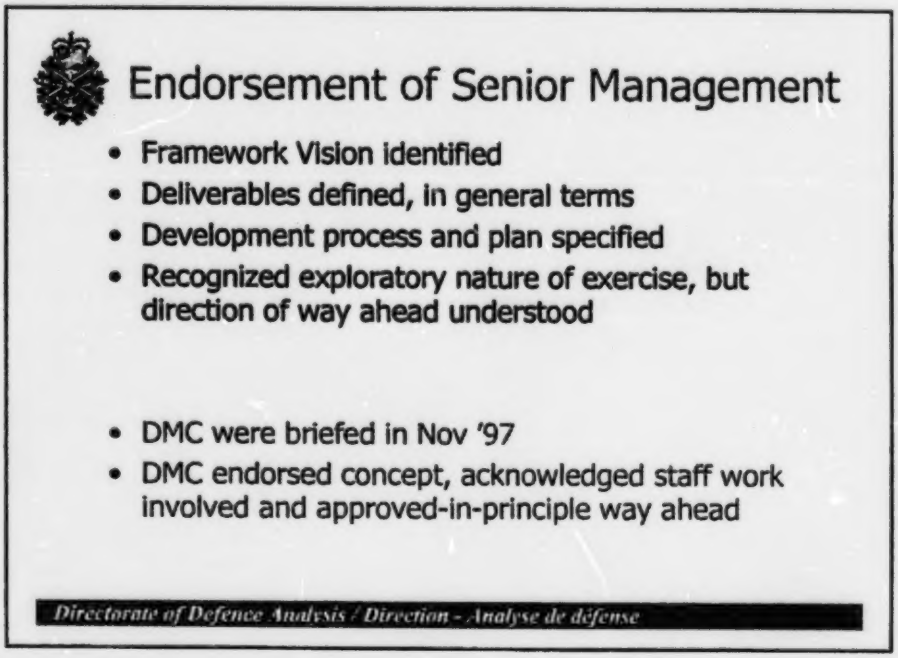
34. After the initial development of the snapshots, DDA foresaw a four-track approach would be needed to complete the development of the FPS Framework.

35. Track 1 would identify the capabilities demanded by the scenarios (this could start with the Snapshots and be refined with the expanded descriptions. Track 2 would expand the snapshots to an operational level of detail to support detailed capability analysis. Track 3 would develop the analysis tools needed to perform capability requirements assessments on the individual scenarios and evaluate risk associated with concurrent operations. Track 4 would conduct the actual full spectrum capability requirements analysis of the CF.

36. Each of the development tracks could proceed in parallel and would Provide and receive input from the other tracks, as appropriate.

37. Each of these tracks will be discussed in greater detail.

SENIOR MANAGEMENT ENDORSEMENT


Endorsement of Senior Management
• Framework Vision identified
• Deliverables defined, in general terms
• Development process and plan specified
• Recognized exploratory nature of exercise, but direction of way ahead understood
• DMC were briefed in Nov '97
• DMC endorsed concept, acknowledged staff work involved and approved-in-principle way ahead
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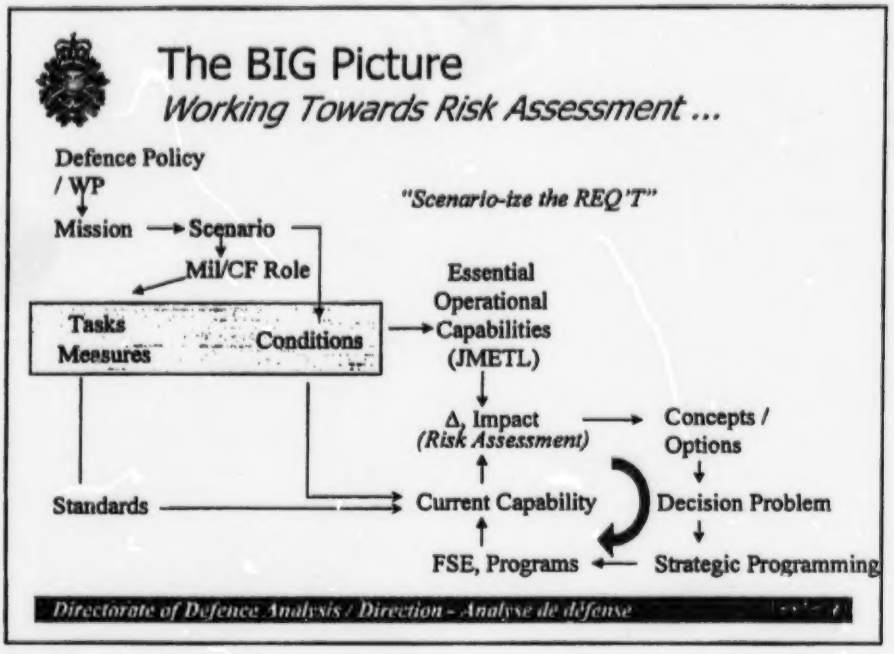
Slide 13 : Status Of Senior Management Endorsement

38. At this stage in the project, DDA felt that the Framework had advanced sufficiently to brief the Defence Management Committee (DMC) and seek its endorsement. DMC was briefed on the general concept and the proposed way ahead in Nov 97. DMC endorsed the concept and approved the way ahead.

FORCE PLANNING AND DEVELOPMENT

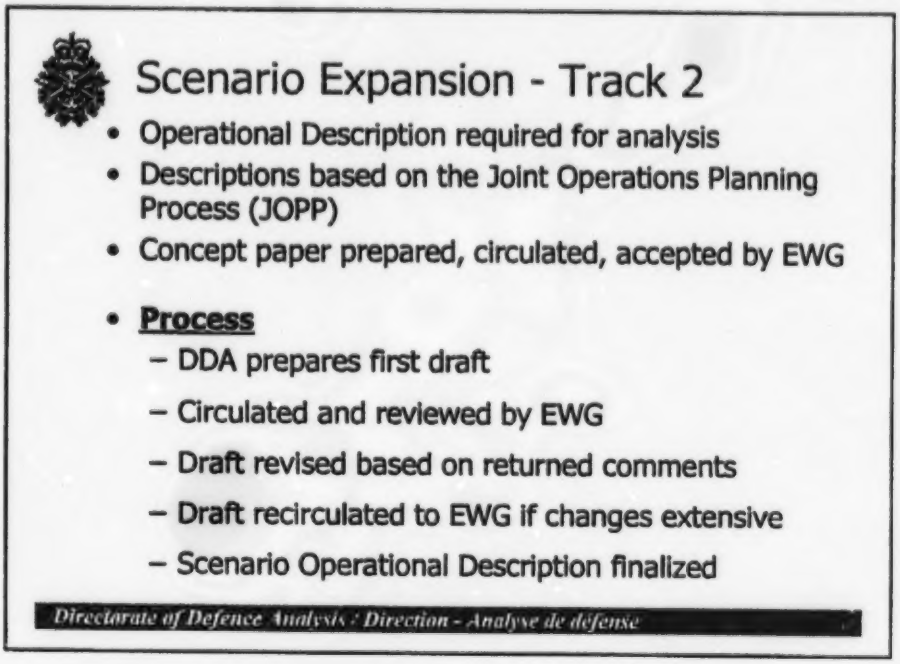


Slide 14 : The Big Picture – Working Towards Risk Assessment

39. The Figure above shows how the FPS Framework could fit into the general Force Development Process. From Defence Policy as developed in White Paper, missions have been defined and are captured in an 11-scenario sample. Given a defined role of Military/CF forces in each scenario, tasks must be performed under a set of conditions, which will achieve varying degrees of success as specified by various measures. On one side, it should be possible to derive a robust set of essential operational capabilities (Joint Mission Essential Task List - JMETL). Capability quantification, based on reasonable standards of the level of preparedness of our Force Structure Elements (FSEs) and present/future programs, should allow us to measure the gap and judge the impact of this gap in terms of mission success.

40. The FPS Framework adds value by providing: a process for joint capability analysis, scenarios as means to assess risk, a means to Identify what is needed (i.e. capabilities), without defining how to deliver it.

SCENARIO EXPANSION


Scenario Expansion - Track 2
• Operational Description required for analysis
• Descriptions based on the Joint Operations Planning Process (JOPP)
• Concept paper prepared, circulated, accepted by EWG
• Process
– DDA prepares first draft
– Circulated and reviewed by EWG
– Draft revised based on returned comments
– Draft recirculated to EWG if changes extensive
– Scenario Operational Description finalized
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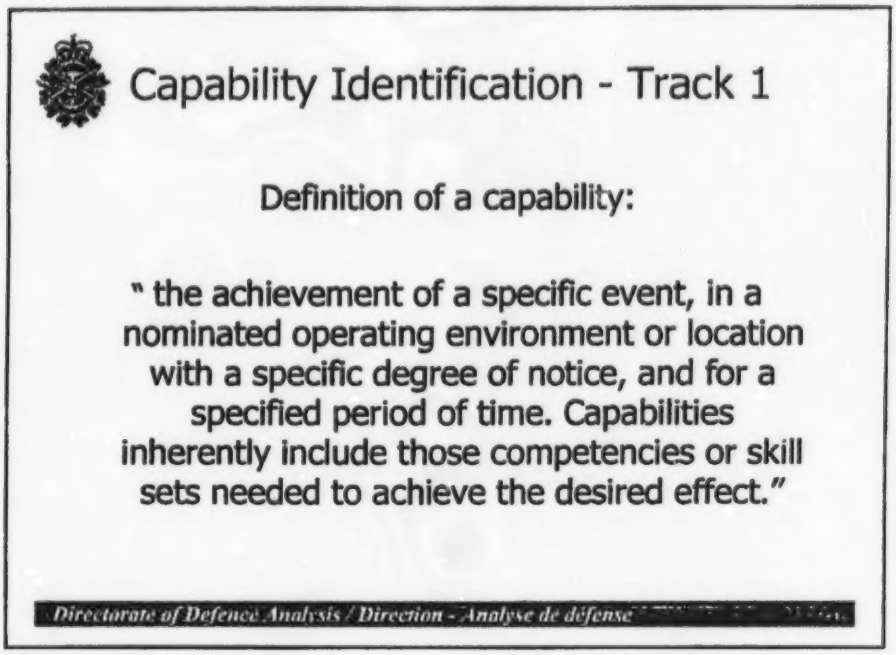
Slide 15 : Scenario Expansion – Track 2

41. Track 2 will be explained first because it is the most independent of the four and the others should be explained consecutively.

42. The objective for Track 2 is to produce a scenario description with sufficient detail to support analysis. It was decided to use the Joint Operations Planning Process (JOPP) as the basis for scenario expansion because of comprehensiveness and operator familiarity. This approach was accepted by the EWG.

43. After an internal trial, it was felt that the most efficient process was for DDA to develop a strawman and refine it using the EWG. Depending on the magnitude of changes proposed by the EWG, two reviews could be necessary before the scenario description was deemed complete. The status of this work will be reported at the DGSP briefing on 14 July 99.

DEFINITION OF CAPABILITY


Capability Identification - Track 1
Definition of a capability:
" the achievement of a specific event, in a nominated operating environment or location with a specific degree of notice, and for a specified period of time. Capabilities inherently include those competencies or skill sets needed to achieve the desired effect."
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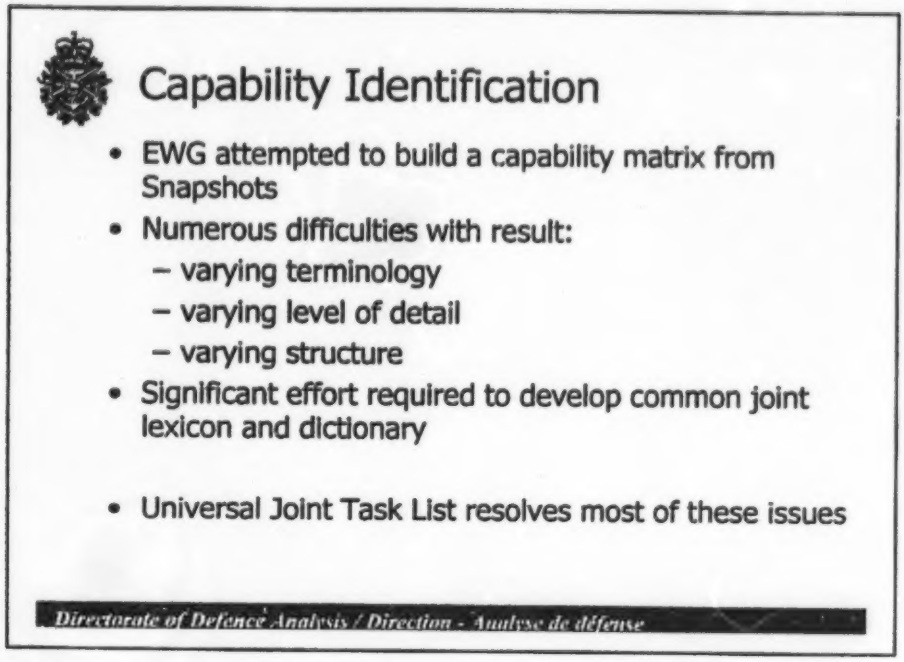
Slide 16 : Definition Of Capability

44. The key to advancing Track 1 capability identification was to specify what was meant by a capability on a conceptual level. The definition chosen was based on one that Australia used in a recent capability review. For the purposes of the FPS Framework, a capability is essentially an event or effect produced in a specified environment and sustained for a period of time.

45. This abstract concept is necessary if we are to avoid think of capabilities as equipment. This definition shifts the focus to what must be achieved, not how it is achieved.

CAPABILITY IDENTIFICATION


Capability Identification
• EWG attempted to build a capability matrix from Snapshots
• Numerous difficulties with result:
– varying terminology
– varying level of detail
– varying structure
• Significant effort required to develop common joint lexicon and dictionary
• Universal Joint Task List resolves most of these issues
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Slide 17 : Capability Identifiaction – Track 2

46. The EWG was initially tasked to develop a capability catalogue based on the scenario Snapshots to gain experience looking at capabilities in a conceptual fashion and begin the process of capability identification. The results of this effort indicated that there were several issues of uniqueness and lack of common terminology to be dealt with and DDA began searching for a means to resolve the problems.

47. The solution found was to utilize the Universal Joint Task List, originally developed by the United States. Every other approach available meant developing something internally at great effort, which would delay progress.

UNIVERSAL JOINT TASK LIST

Universal Joint Task List
Capability Hierarchy
(630 defined Tasks)
Accomplish Objectives of
STRATEGIC NATIONAL
National Military Strategy
SN.1 CONDUCT STRATEGIC DEPLOYMENT & REDEPLOYMENT
SN.2 DEVELOP STRATEGIC INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE
SN.3 EMPLOY FORCES
SN.4 PROVIDE SUSTAINMENT
SN.5 PROVIDE STRATEGIC DIRECTION & INTEGRATION
SN.6 CONDUCT MOBILIZATION
SN.7 CONDUCT FORCE DEVELOPMENT
SN.8 FOSTER MULTINATIONAL AND INTERAGENCY RELATIONS
Accomplish Objectives of
STRATEGIC THEATER
Theater and Campaign Strategy
ST.1 DEPLOY, CONCENTRATE, AND MANEUVER THEATER FORCES
ST.2 DEVELOP THEATER STRATEGIC INTELLIGENCE, SURVEILLANCE AND RECONNAISSANCE
ST.3 EMPLOY THEATER STRATEGIC FIREPOWER
ST.4 SUSTAIN THEATER FORCES
ST.5 PROVIDE THEATER STRATEGIC COMMAND AND CONTROL
ST.6 PROVIDE THEATER PROTECTION
ST.7 ESTABLISH THEATER FORCE REQUIREMENTS AND READINESS
ST.8 DEVELOP AND MAINTAIN ALLIANCE AND REGIONAL RELATIONS
Accomplish Objectives of
OPERATIONAL
Subordinate Campaigns and Major Operations
OP.1 CONDUCT OPERATIONAL MOVEMENT & MANEUVER
OP.2 DEVELOP OPERATIONAL INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE
OP.3 EMPLOY OPERATIONAL FIREPOWER
OP.4 PROVIDE OPERATIONAL SUPPORT
OP.5 EXERCISE OPERATIONAL COMMAND & CONTROL
OP.6 PROVIDE OPERATIONAL PROTECTION
Accomplish Objectives of
TACTICAL
Battles and Engagements
TA.1 DEPLOY/CONDUCT MANEUVER
TA.2 DEVELOP INTELLIGENCE
TA.3 EMPLOY FIREPOWER
TA.4 PERFORM LOGISTICS AND COMBAT SERVICE SUPPORT
TA.5 EXERCISE COMMAND & CONTROL
TA.6 PROTECT THE FORCE
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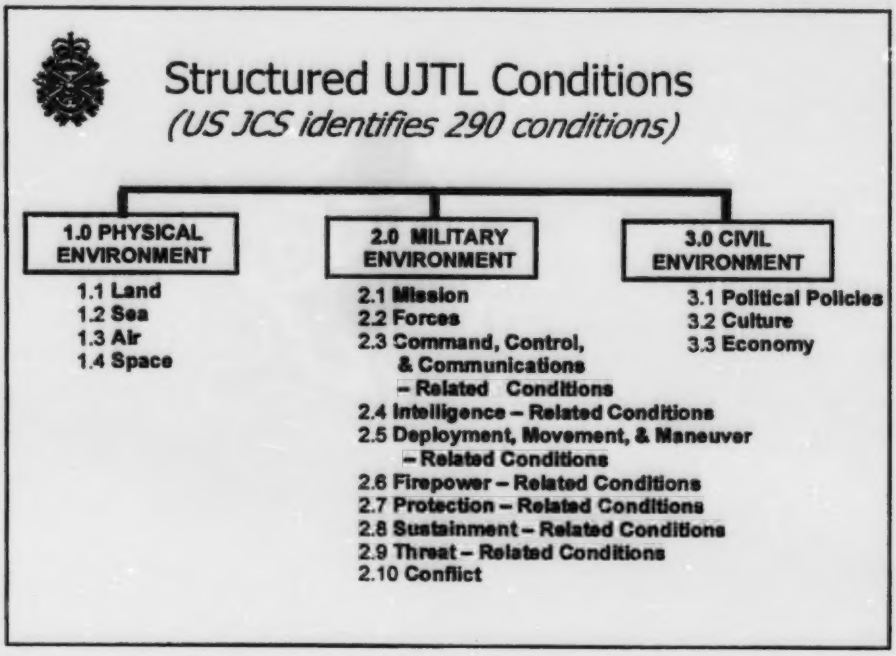
Slide 18 : Universal Joint Task List

48. To address the problem of using a common terminology when defining capabilities to ensure mutual understanding among participants, the Universal Joint Task List (UJTL) was proposed.

49. The UJTL was developed by the US Joint Chiefs of Staff. The structure has four levels: two strategic, one operational and one tactical and defines 630 tasks. Each task within one of these levels has three sub-levels, three levels of sub-tasks. Each sub-task has a well defined definition.

50. The UJTL framework can be used to shows linkages across levels and within a level. This allows related tasks within a level to be identified, as well as showing how lower level tasks feed higher levels tasks.

UJTL CONDITIONS

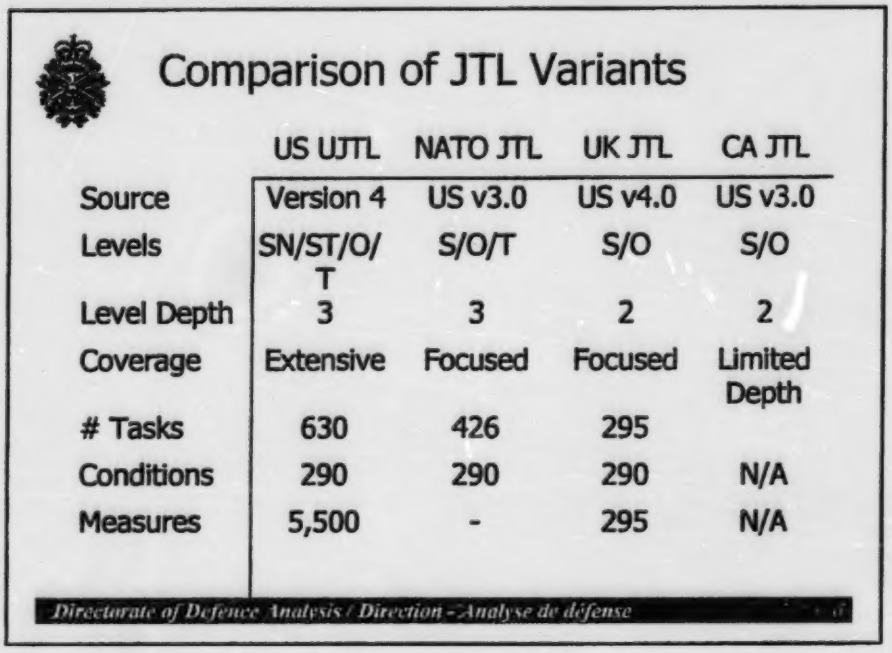


Slide 19 : Structured UJTL Conditions

51. The UJTL recognizes conditions in the physical, military, and civil environments. Each of these can be specified to an appropriate level of detail. A total of 290 conditions relevant to military operations have been identified.

52. For the purposes of the Scenario Framework, DDA is proposing that a task with associated conditions act as a surrogate for a conceptual capability.

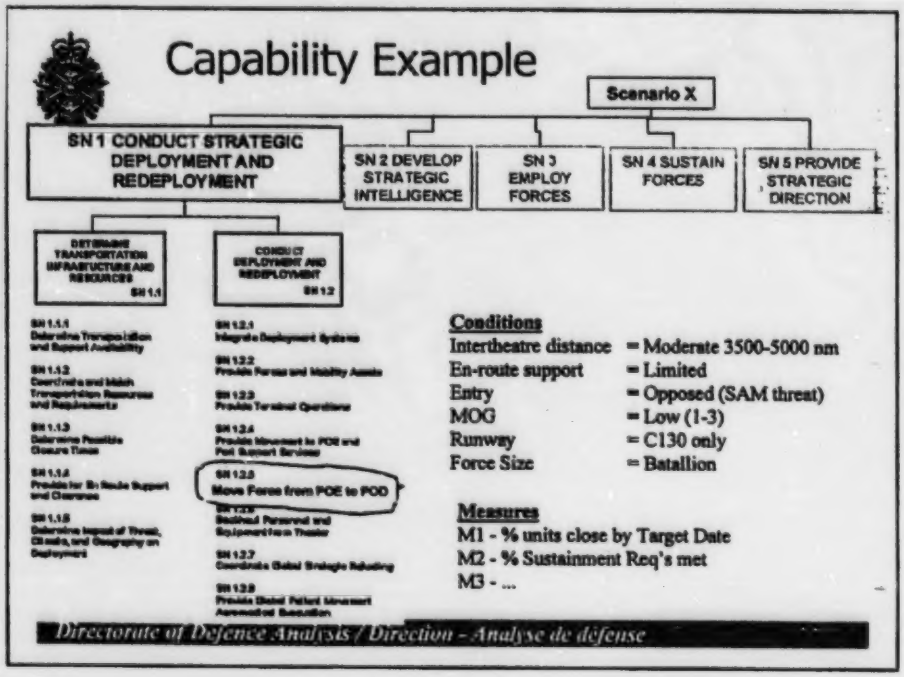
JOINT TASK LIST VARIANTS



Slide 20 : JTL Variants

53. There are a number of variants of the UJTL, all based on the US version. DDA proposes using the United Kingdom (UK) version because it has been significantly adapted to deal with operations other than war and is more closely aligned doctrinally with the CF than the US or NATO versions. The US and NATO versions focus on tasks related to pure warfighting, while the Canadian version, initiated by the Deputy Chief of Defence Staff organization, remains incomplete.

JTL CAPABILITY EXAMPLE


Capability Example
Scenario X
SN 1 CONDUCT STRATEGIC DEPLOYMENT AND REDEPLOYMENT
SN 2 DEVELOP STRATEGIC INTELLIGENCE
SN 3 EMPLOY FORCES
SN 4 SUSTAIN FORCES
SN 5 PROVIDE STRATEGIC DIRECTION
SN 1.2.6 Move Force from POE to POD
Conditions
Intertheatre distance = Moderate 3500-5000 nm
En-route support = Limited
Entry = Opposed (SAM threat)
MOG = Low (1-3)
Runway = C130 only
Force Size = Batallion
Measures
M1 - % units close by Target Date
M2 - % Sustainment Req's met
M3 - ...
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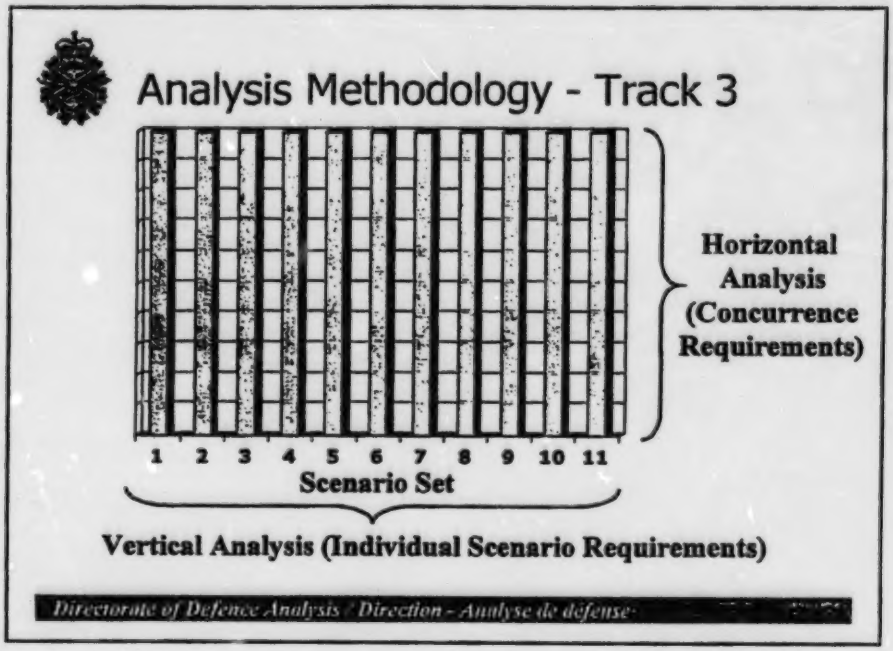
Slide 21 : Example Of Capability

54. This Figure shows a simple example of a capability in the UJTL hierarchy – Strategic Lift. For a given scenario, Task SN1, Conducting Strategic Deployment, is a function of the ability to both plan and to conduct the operation. Conducting the operation involves many tasks, a central one being moving forces from a point of embarkation (POE) to a point of disembarkation (POD). This, however, has to be done under the conditions of the scenario. For example, the distance between POE and POD, the level of on-route support, the size of the force to be moved, etc.

55. Once the task and conditions are specified, an assessment of measures must be made. Here the Figure shows two measures that could be used to assess this capability: the percentage of the force transported to the theatre of operation by a target date and the percentage of required sustainment delivered on time.

56. Note that in this process, we have focused on what needs to be accomplished, not how it must be accomplished. Solutions could be mix of airlift, sealift and rail move, using own assets or contracted.

SCENARIO ANALYSIS


Analysis Methodology - Track 3
Horizontal Analysis (Concurrence Requirements)
1 2 3 4 5 6 7 8 9 10 11
Scenario Set
Vertical Analysis (Individual Scenario Requirements)
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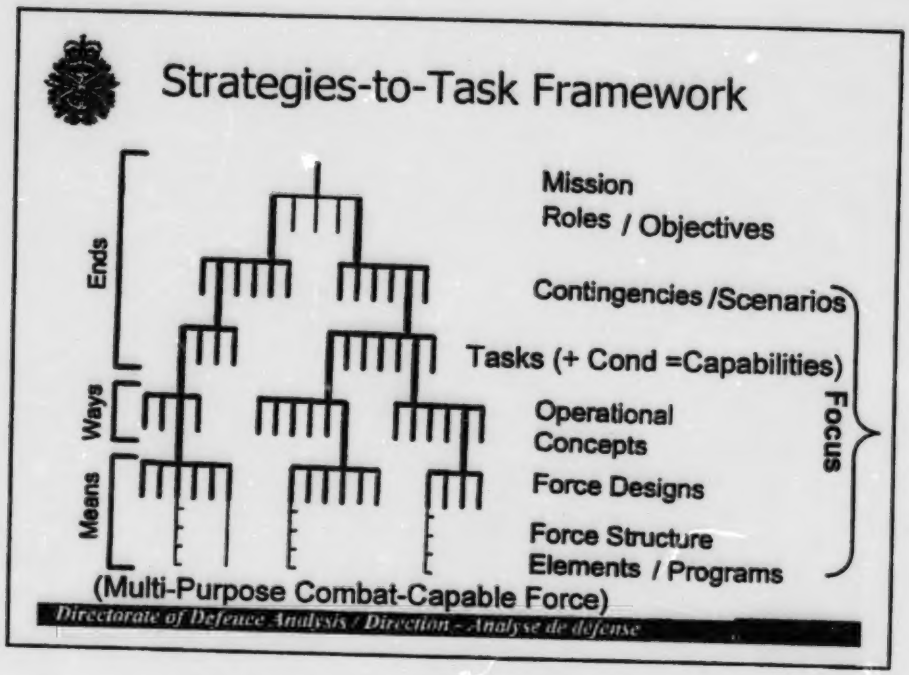
Slide 22 : Analysis Methodology

57. In looking at the analysis requirements of the framework, two types of analysis are needed. One to determine the capability requirements of each individual scenario. This has been referred to as the Vertical Analysis. The other type of analysis has to deal with the requirements imposed by the potential for concurrent operations. This has been called the Horizontal Analysis.

STRATEGIES-TO-TASK CONCEPT

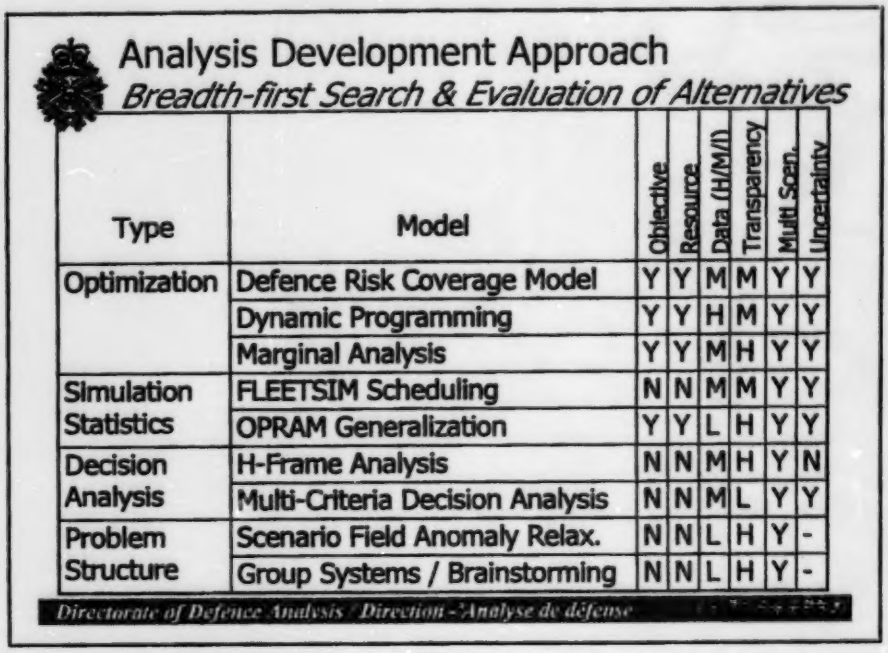


Slide 23 : Strategies-To-Task Framework

58. In early 90's, the RAND Corp developed the Strategies-to-Task (STT) framework for the USAF. In general terms, this structure captures the essence of the task at hand. It provides a good representation of the approach that will be used in the Scenario Framework, although this will not be the specific tool embedded in the Framework.

59. It is a method for linking national goals to operational tasks. The STT hierarchical structure can be used for modernization planning by linking operational tasks to force structure. Although it does not provide solutions in itself, it makes more transparent the relationship between strategic objectives and ultimate means.

SCENARIO ANALYSIS TOOLS


Analysis Development Approach
Breadth-first Search & Evaluation of Alternatives
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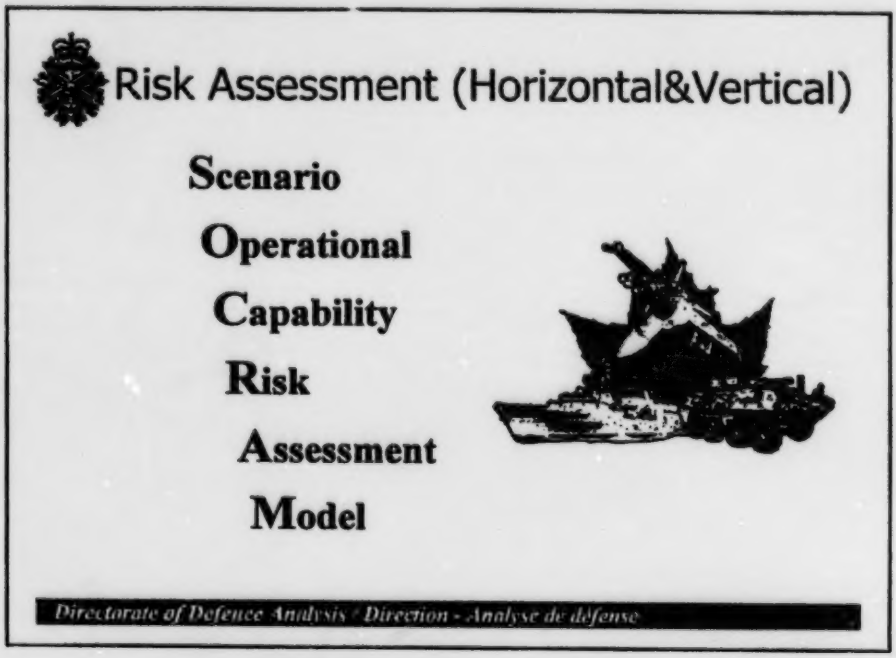
Type	Model	Objective	Resource	Data (H/M/l)	Transparency	Multi Scen.	Uncertainty
Optimization	Defence Risk Coverage Model	Y	Y	M	M	Y	Y
	Dynamic Programming	Y	Y	H	M	Y	Y
	Marginal Analysis	Y	Y	M	H	Y	Y
Simulation Statistics	FLEETSIM Scheduling	N	N	M	M	Y	Y
	OPRAM Generalization	Y	Y	L	H	Y	Y
Decision Analysis	H-Frame Analysis	N	N	M	H	Y	N
	Multi-Criteria Decision Analysis	N	N	M	L	Y	Y
Problem Structure	Scenario Field Anomaly Relax.	N	N	L	H	Y	-
	Group Systems / Brainstorming	N	N	L	H	Y	-

Slide 24 : Analysis Development Approach

60. The approach taken to satisfy the analysis requirements of the Framework has been to examine a broad range of techniques, from quantitative approaches, such as optimization and simulation, to qualitative methods of decision analysis and problem structuring techniques. A sample of the analysis tools examined is shown in the Figure. Criteria to evaluate the utility and feasibility of the tools were identified and demonstrations on many of the tools were created.

61. From this evaluation, it was concluded that no single approach addresses all the issues. However, it is believed that a few tools used in combination can provide a great deal of insight.

RISK ASSESSMENT MODEL

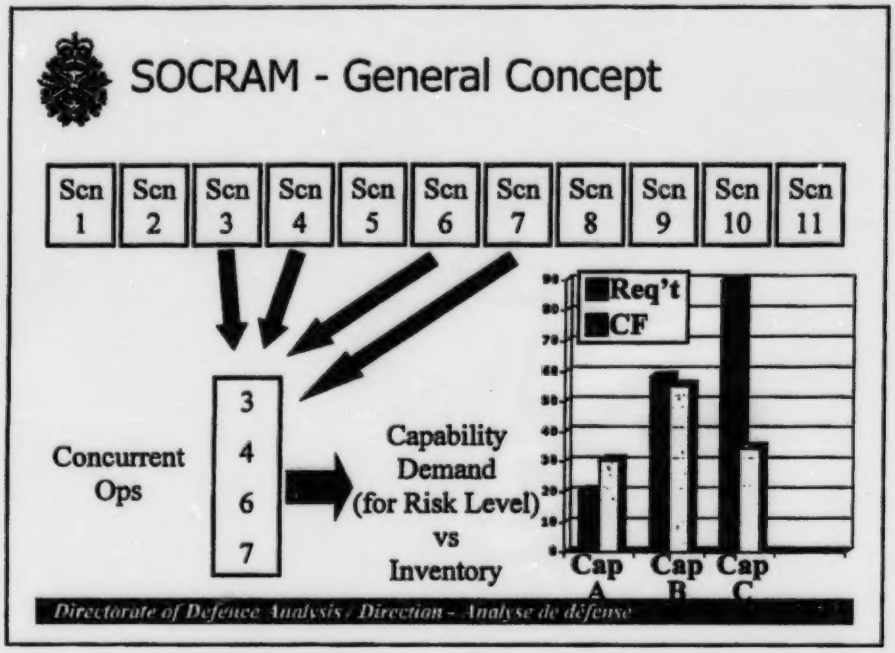


Slide 25 : Risk Assessment Model

62. The concurrence analysis tool proposed for the framework is based on an Operational Research tool developed to look at Air Force operational personnel requirements. The tool has been expanded and enhanced to deal with the capability requirements problem and as a result contains many features also present in the other tools that were investigated.

63. The model is called SOCRAM, which stands for Scenario Operational Capability Risk Assessment Model.

SOCRAM CONCEPT

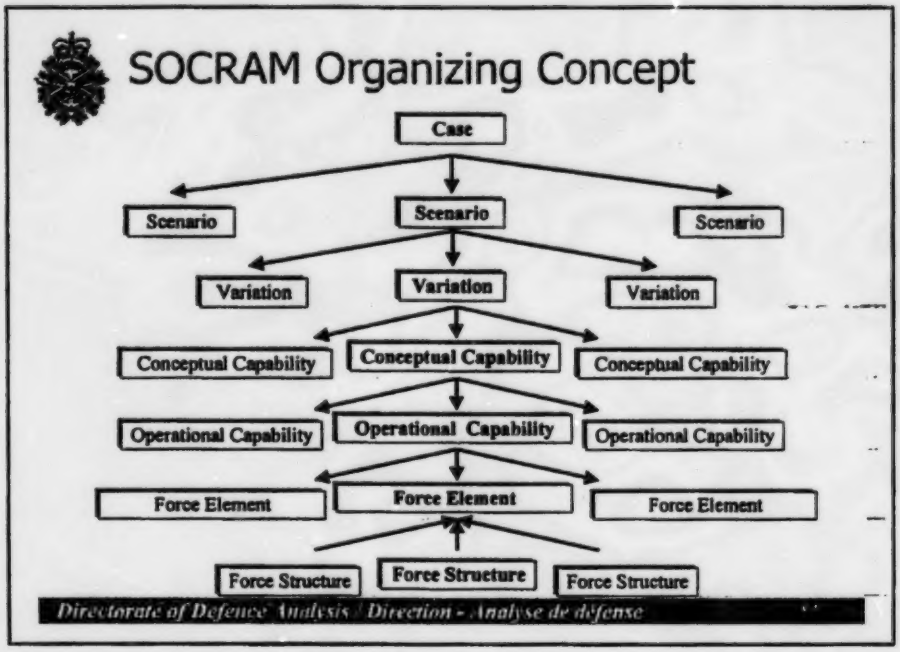


Slide 26 : SOCRAM – General Concept

64. In terms of the general concept, SOCRAM takes a sample of concurrent operations from the scenario set (based on probability of occurrence) and determines the capability requirements for the sample. Doing this a number of times allows a profile of capability demand to be defined, in other words forming a risk relationship based on demand. The purpose of the SOCRAM model is to relate, for a given risk level, how the demand for CF capabilities compares to the inventory in the current or a proposed force structure.

65. The model can also allow the major drivers for the demand to be identified.

SOCRAM STRUCTURE



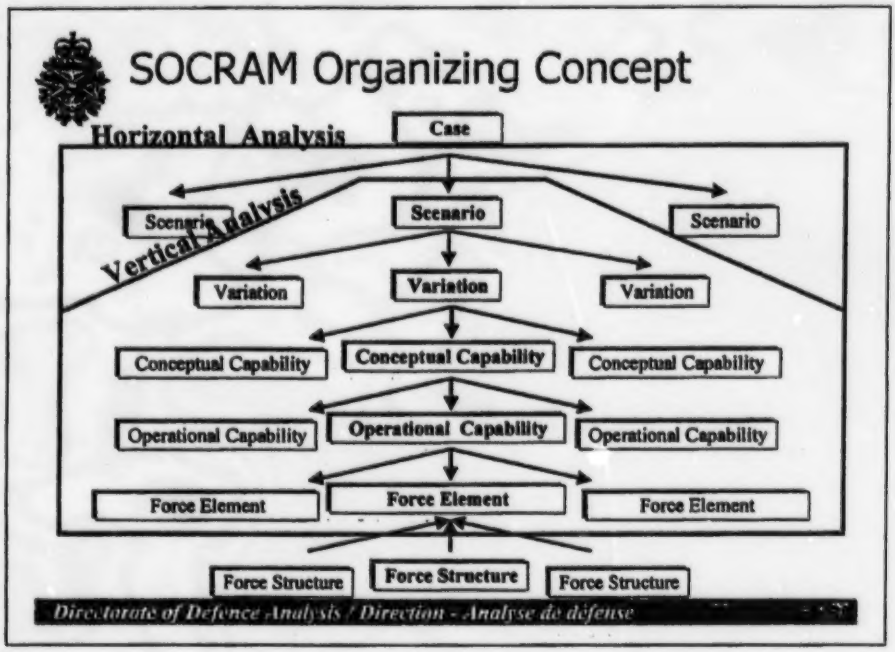
Slide 27 : SOCRAM Organizing Concept

66. This Figure shows the structure embedded in the SOCRAM model. At the top, the "case" manages the total collection of data specific to the analysis being conducted. It is really a configuration management function. The second level is where the analysis really starts. It is here that one specifies what scenarios and combinations are to be studied.

67. Each scenario can have a number of variations associated with it. Each scenario variation has a set of associated capability requirements, identified using the Joint Task List. Capabilities can be linked to force elements, where the association to equipment and units (existing or futuristic) would be made.

68. Experience using SOCRAM has led to the belief that the linkage between JTL capabilities and force elements is easier if there is an intermediate level that translates tasks into operational capabilities more familiar to military operators and planners. From the earlier example of strategic deployment, the JTL capability to move the force from POE to POD would be the conceptual capability. The operational capability could be sealift and airlift.

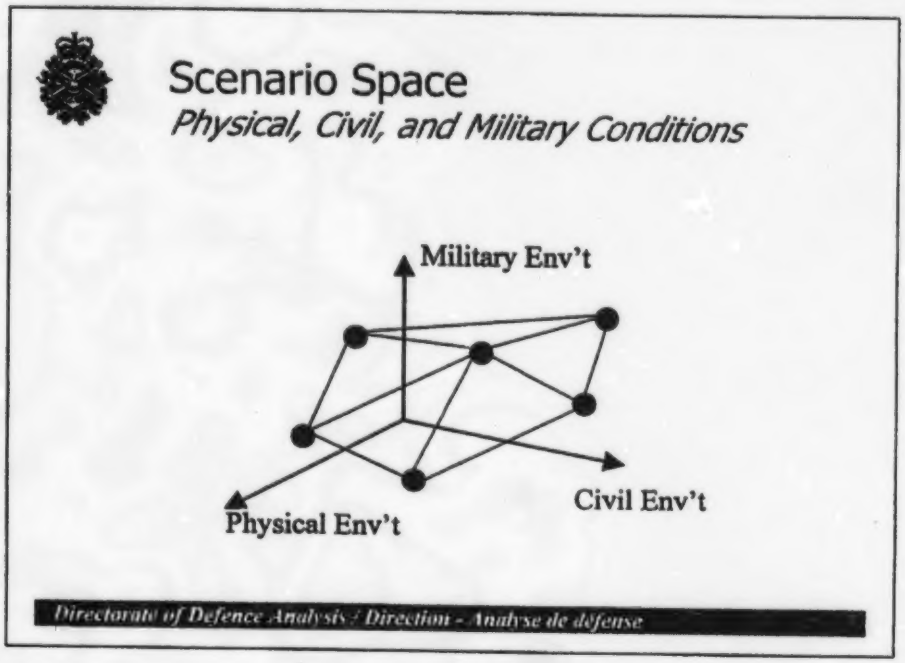
VERTICAL & HORIZONTAL ANALYSIS



Slide 28 : Vertical/Horizontal Analysis With SOCRAM

69. Examining a single scenario or variation yields the Vertical Analysis required, while dealing with the whole scenario set provides the Horizontal Analysis.

SCENARIO VARIATIONS

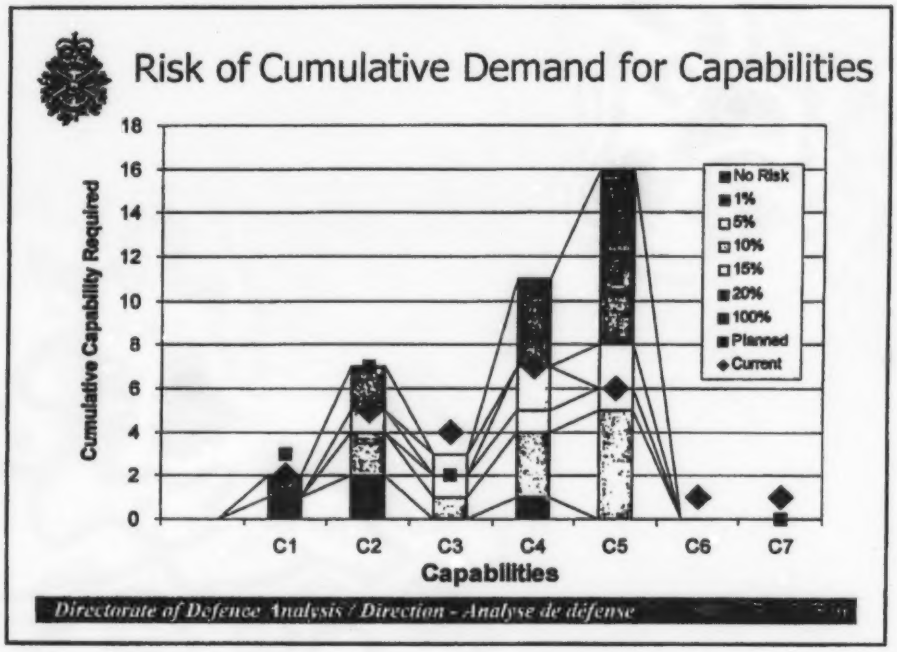


Slide 29 : Scenario Space

70. Each scenario can be characterized by specifying conditions in the physical, civil and military environments. In our case, there is also the extra dimension of the CF role, which is not shown in the Figure.

71. Each scenario is a single point in the scenario space. One will recall that it was intended that the specified scenarios be representative of the CF operations. The ability to specify variations in SOCRAM provides the mechanism to explore around the scenarios in terms of the conditions or CF role.

SAMPLE OUTPUT FROM SOCRAM



Slide 30 : Representative Output From SOCRAM

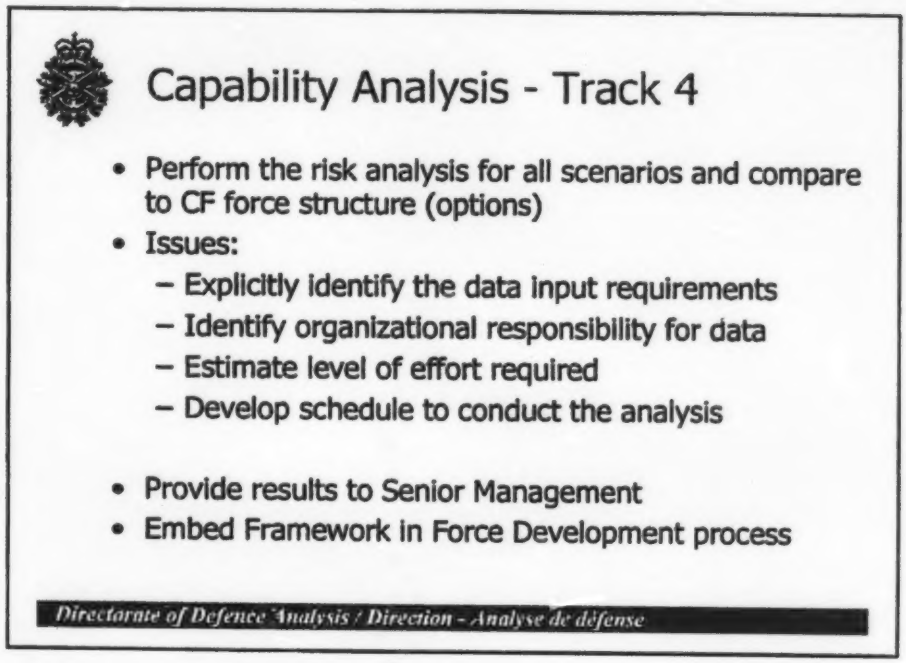
72. This Figure shows representative output from SOCRAM. It is slightly different than what was shown earlier but is much richer in information.

73. Each coloured band indicates the amount of capability required to meet a given risk level based on demand. The blue diamonds indicate the existing level of capability in the CF and the associated risk level. The red squares can indicate planned adjustments in CF capability and their associated risk level.

74. While the demand and related risk level would remain constant for a specified set of conditions, a comparison of the implied risk level for different force structure options can be displayed. This type of chart can also be used to show risk level as a function of the percentage of capability required allowing direct comparison between different capabilities.

75. These types of charts can also be plotted for force elements.

FULL CF CAPABILITY ANALYSIS


Capability Analysis - Track 4
• Perform the risk analysis for all scenarios and compare to CF force structure (options)
• Issues:
– Explicitly identify the data input requirements
– Identify organizational responsibility for data
– Estimate level of effort required
– Develop schedule to conduct the analysis
• Provide results to Senior Management
• Embed Framework in Force Development process
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Slide 31 : Capability Analysis – Track 4

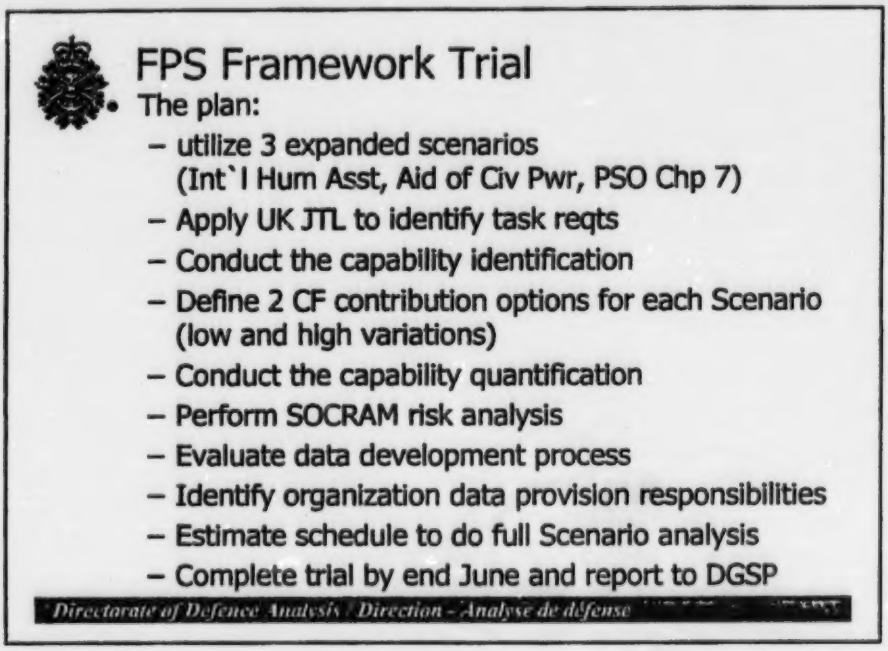
76. The last track of the FPS Framework, TRACK 4, involves the actual conduct of the scenario analysis. To do this a number of issues dealing with identifying who will have responsibility for which functions in the analysis must be resolved.

77. Recommendations on these issues will be offered at the briefing on the 14th.

78. Once the Scenario Analysis has been completed, the results must be provided to Senior Management.

79. Lastly, to take full advantage of the Framework, it should be explicitly embedded in the evolving Force Development process.

PROOF-OF-CONCEPT TRIAL


FPS Framework Trial
The plan:
– utilize 3 expanded scenarios (Int`l Hum Asst, Aid of Civ Pwr, PSO Chp 7)
– Apply UK JTL to identify task reqts
– Conduct the capability identification
– Define 2 CF contribution options for each Scenario (low and high variations)
– Conduct the capability quantification
– Perform SOCRAM risk analysis
– Evaluate data development process
– Identify organization data provision responsibilities
– Estimate schedule to do full Scenario analysis
– Complete trial by end June and report to DGSP
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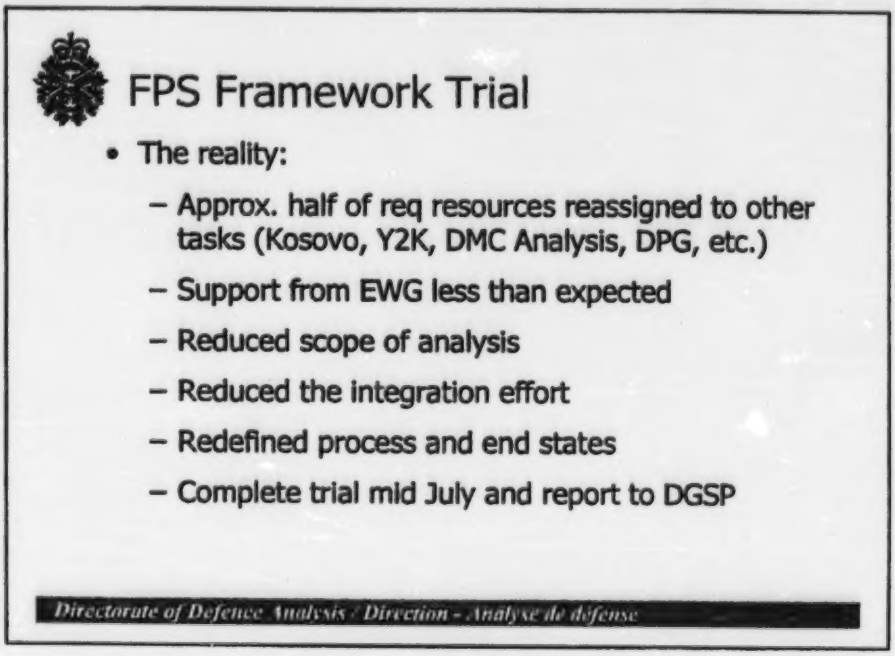
Slide 32 : FPS Framework Trial

80. In March 1999, DDA began a Proof-of-Concept Trial. The plan was to use three expanded Scenarios and go through the complete process to identify the capability requirements and link them to existing force structure elements.

81. Each of the scenarios would have two levels of CF contribution identified, a low and a high (2 variations). Required capabilities would be identified and the risk analysis performed. Lessons learned from the trial would guide the process to conduct the full Scenario analysis.

82. The plan was the complete the trial by the end of June and report back to DGSP with results. The schedule prepared for the Trial was quite ambitious but it was felt to be doable.

CONSTRAINTS ON CONCEPT TRIAL


FPS Framework Trial
• The reality:
– Approx. half of req resources reassigned to other tasks (Kosovo, Y2K, DMC Analysis, DPG, etc.)
– Support from EWG less than expected
– Reduced scope of analysis
– Reduced the integration effort
– Redefined process and end states
– Complete trial mid July and report to DGSP
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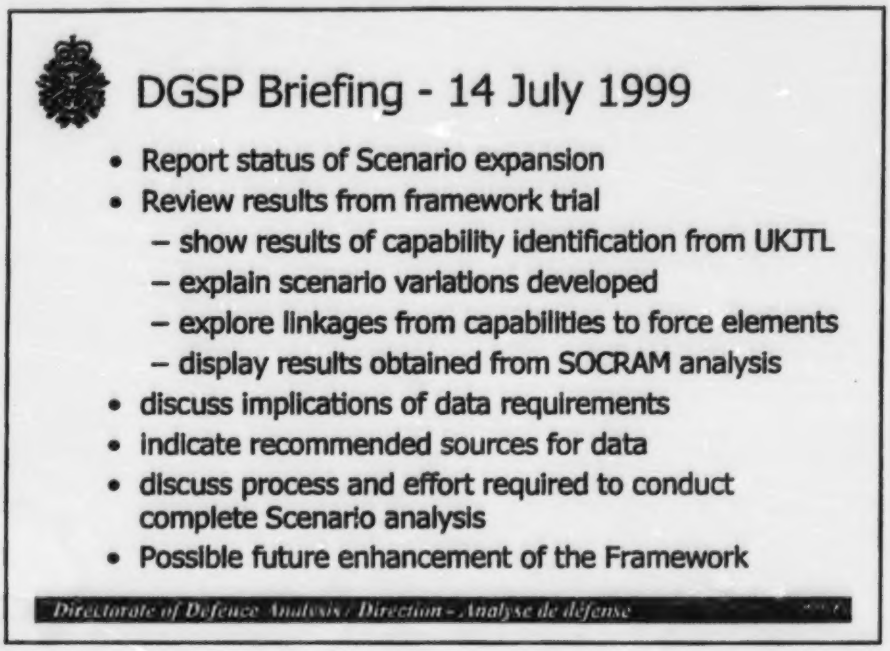
Slide 33 : Constraints On Framework Trial

83. Shortly after the Trial began, resource problems were encountered. Many of the key players were re-assigned to other high priority tasks. It was felt to be very important stay with the milestone of briefing DGSP before the summer leave and posting period was in full swing. So, the scope of the trial was significantly reduced and the focus was shifted to demonstrating the process rather than trying to complete a rigorous validated analysis of the three Scenarios. In fact, the trial will be progressing until just before the 14th when the presentation will have to be finalized.

84. This point is mentioned not to make excuses but rather to point out that resources have been a continuous problem throughout the Framework development and this must be kept in mind when planning for the complete analysis activity later.

TRIAL RESULTS BRIEFING


DGSP Briefing - 14 July 1999
• Report status of Scenario expansion
• Review results from framework trial
– show results of capability identification from UKJTL
– explain scenario variations developed
– explore linkages from capabilities to force elements
– display results obtained from SOCRAM analysis
• discuss implications of data requirements
• indicate recommended sources for data
• discuss process and effort required to conduct complete Scenario analysis
• Possible future enhancement of the Framework
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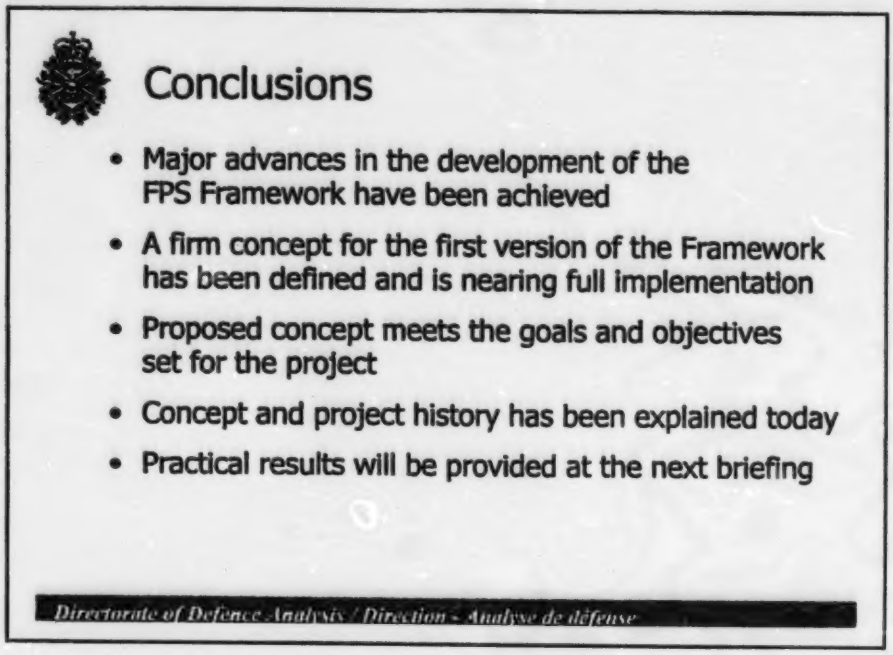
Slide 34 : DGSP Briefing – 14 July 1999

85. On the 14th of July 1999, the results of the Proof-of-Concept Trial will be presented. The briefing will cover:

- the status of the Scenario Snapshots and the Expansion,
- the application of the UK Joint Task List for capability identification and capability quantification in SOCRAM,
- the results from the analysis,
- details on how a full analysis could be conducted and what the issues will be, and
- future developments of the Framework that could be undertaken.

CONCLUSIONS


Conclusions
• Major advances in the development of the FPS Framework have been achieved
• A firm concept for the first version of the Framework has been defined and is nearing full implementation
• Proposed concept meets the goals and objectives set for the project
• Concept and project history has been explained today
• Practical results will be provided at the next briefing
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Slide 35 : Conclusions

86. In conclusion it is fair to say that DDA is very enthusiastic about what has been accomplished here. It is believed that major advances have been made.

87. A first version of the Framework concept that can be implemented and should be very useful for Senior Management has been specified. It provides a working foundation upon which further enhancements can be made. The concept proposed satisfies all the goals and objectives that were set for the project.

88. In this briefing, the concept for the Scenario framework and some of its development history have been explained. At the next briefing, the Scenario Framework development team will show practical results from the Framework and discuss the way ahead for implementation. Your endorsement and direction for the way ahead will be sought.

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3. **Defence Planning Guidance (DPG) 1997**, Department of National Defence, 1996

4. **1901-5-2 (DDA 2)**, Director General Strategic Planning (DGSP) letter, dated 16 April 1997

5. **The Development of a Scenario Set for Departmental Force Planning**, Bradfield, A., Christopher, G.L. and MacLean, D. LCol, Director Operational Research (Joint & Land) Research Note RN 9822, November 1998

6. **Defence Planning Guidance (DPG) 2000**, Department of National Defence, 1999

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One of the first tasks given to the Strategic Planning Operational Research Team (SPORT), upon its establishment in January 1997, was to lead the effort of the Directorate of Defence Analysis (DDA) to develop a scenario-based capability planning framework. This framework is commonly referred to as the Force Planning Scenario Framework. After consulting with Canada's major Allies, reviewing the literature and exploring possible methodologies, a concept for the framework was specified. A proof of concept trial was undertaken during the Spring of 1999. Before providing the Director General Strategic Planning (DGSP) with the results of the trial, a briefing covering the background of the development effort leading to the concept was conducted.

This report covers the content of the background briefing given to DGSP on 28 June 1999. This report also serves as one of the documents recording the history and process of the development of the Force Planning Scenario Framework.

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